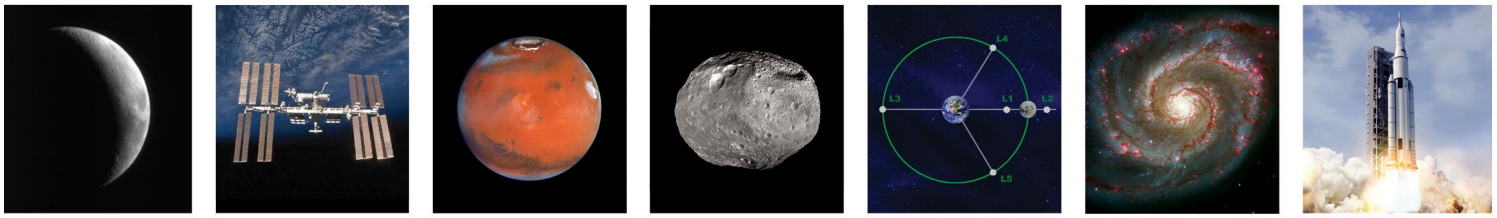
National Aeronautics and Space Administration

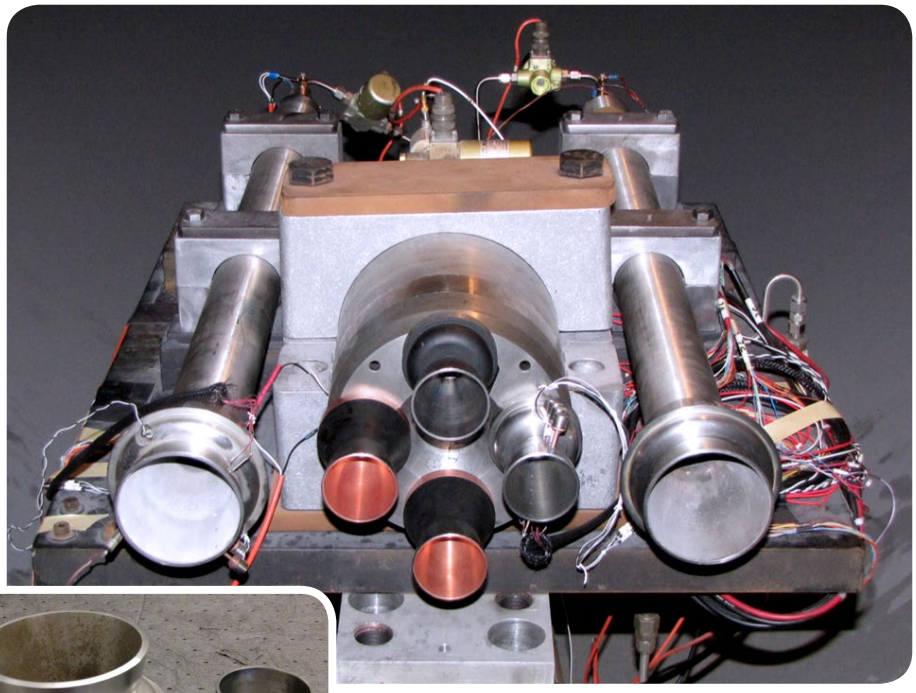
Space Launch System
Highlights

February 2014

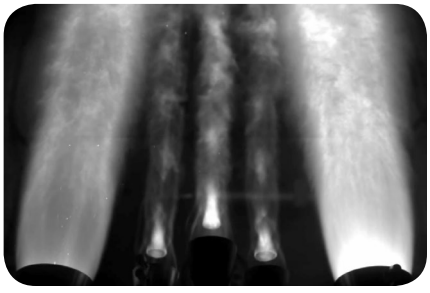


Mini Rocket Models to be Used in a Big Way for SLS Base Heating Test

As part of the Pathfinder Test Program, 2-percent scale models of the SLS solid rocket boosters and core stage RS-25 engines have been designed and built ahead of base heating testing scheduled this summer. Engineers will use the models of the SLS propulsion system to understand heating environments that the base of the vehicle will experience upon ascent. Data from tests on those models will be used for the design of the rocket's base thermal protection system, which keeps major hardware, wiring and—later—the crew safe from the extreme heat the boosters and engines create when ignited. The current model RS-25 engine clocking configuration, different from the SLS configuration, is used to adequately visualize plumes during testing. The work was a collaborative effort between Marshall Space Flight Center engineers and Calspan-University of Buffalo Research Center Inc., in Buffalo, N.Y.



◀ A size comparison of the model booster and engine nozzles to a quarter. *(NASA/MSFC)*



The 2-percent scale models of the SLS boosters and core stage engines are ignited for a 100-millisecond, hot-fire test. The test was used to validate the design of the models. *(NASA/MSFC)* ▶

Spaceflight Partners: Beranek Inc. Precision Machining

EDITOR'S NOTE: Every month, SLS Highlights turns the spotlight on one of the industry partners helping to create the largest rocket ever built for human space exploration. In this issue, we profile Beranek Inc. Precision Machining in Los Angeles.

The Aerojet Rocketdyne RS-25 engines that will power the first stage of the SLS have a storied history in support of the Space Shuttle Program. Beranek Inc. Precision Machining, a family-owned and operated business in the South Bay of Los Angeles, plays a key role in that story as the manufacturer of detailed components for the workhorse engines.

Established in 1978 by Hector Beranek and his sons Daniel, George, Doug and Eric Beranek, the company is predominantly a machine shop with CNC Milling & Turning capabilities for high-precision machining and assembly of complex components for the aerospace and communications industry.

"If you look at an automobile engine—that is a big part of a car. If you break down that engine, it has several parts, and each part is a detailed component," said Efrain Montemayor, purchasing manager at Beranek. "There are pistons, rings, rods, fans, valves and springs that are critical to operations. If you translate the car engine to an RS-25 engine, you'll better understand that there are hundreds to thousands of detailed components, including engine turbine fans, blades, injectors, plates and bells."

Team members from Beranek Inc. Precision Machining in Los Angeles. *(Beranek)*

The company prides itself on the detail-oriented work it does on complex hardware that serves a bigger purpose for human spaceflight and exploration.

"I'm very patriotic," said Montemayor. "To be able to see something go from a basic piece of metal to its finite end of launching people into space is very emotional. There is no better feeling than seeing something from beginning to end."

Tools Building Space Launch System Progress at Michoud

The second SLS core stage forward liquid oxygen (LO2) tank dome recently was completed on the **Circumferential Dome Weld Tool** at NASA's Michoud Assembly Facility. The dome was welded as a "confidence" article to ensure that the weld tool can produce the qualification and flight domes. The SLS **core stage** liquid hydrogen and liquid oxygen tanks will each have two domes similar to the confidence article. The dome will be used to develop inspection techniques for the flight articles. It also will be used for future confidence welding on the Vertical Assembly Center—one of the world's largest welding tools scheduled to be completed in 2014. *(NASA/Michoud)*

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Tools

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Above left, the foundation has been completed, and tooling structure built, on the Vertical Assembly Center. The tool will be used to join domes, rings and barrels together to complete the tanks or dry structure assemblies for the SLS. The tool also will perform nondestructive evaluation on the completed welds. When finished, as depicted in the artist concept, above right, the Vertical Assembly Center will measure 170 feet tall and 78 feet wide. *(NASA/Michoud)*

SLS On the Road…

SLS Boosters Office Manager Alex Priskos, left, talks about SLS at the ATK rocketry display ribbon cutting at Clark Planetarium. Seated, from left, are ATK space launch executive and former astronaut Charlie Precourt, NASA astronaut Tony Antonelli and Seth Jarvis, executive director of the Clark Planetarium. Priskos, a native of Salt Lake City, also took part in a panel discussion on deep space exploration with Precourt and Antonelli. Team members from the SLS Program attended the ATK display unveiling and led SLS events and activities—including interactive displays—at the planetarium. During his visit, Priskos returned to his alma mater, the University of Utah, to meet with students and discuss the positive impact his education has had on his NASA career and building America's next great rocket. *(NASA/MSFC)*

The SLS model makes an appearance at the Association of the United States Army (AUSA) Winter Symposium and Exposition, held this year for the first time in Huntsville, Ala. This year's event managed to quadruple previous years' attendance numbers and provided attendees with an opportunity to learn about SLS. *(NASA/MSFC)*

David Hitt, at chalkboard, talks about SLS on Feb. 20 with students at Sacred Heart Elementary School in Cullman, Ala. Hitt is an ASRC Federal/Analytical Services employee on the SLS Strategic Communications Team at NASA's Marshall Space Flight Center. *(NASA/MSFC)*

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